

## CHAPTER 8 LIVESTOCK PRODUCTION

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### MILK PRODUCING ABILITY AND FATTY ACID COMPOSITION OF MILK LIPIDS UNDER APPLICATION OF “BYPASS” OIL ADDITIVES IN THE DIET OF COWS

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**Problem setting.** It is a well-known fact that linoleic and linolenic acids are essential, but they are not produced in organs and tissues of human bodies. They should be supplied to the body with food. Contrary to the diet of people, who eat seafood, most people in the world suffer from the deficiency of fatty acids n-3, which causes a higher frequency of cardiovascular diseases, coronary atherosclerosis and coronary thrombosis. The named fatty acids are precursors of prostaglandins, anti-inflammatory and anti-thrombotic substances, which positively influence blood vessels. It is proven that linseed oil has a high share of linoleic and linolenic fatty acids in its content. The researches, devoted to the application of its additives in the diet of cows in order to increase the level of Omega-3 and Omega-6 acids in milk fat, are of great interest.

**Main material.** The experiment was made with three groups of cows (5 cows in each group) of black and white Ukrainian dairy breed, selected according to the principle of assimilation by age, lactation period, period after calving, level of milk producing ability and live weight in winter-spring stall-feeding period. Cows of 3–4 year age of the second lactation were engaged in the experiment. The main diet consisted of meadow hay, corn silage, haylage of different herbs and grain mixture, which included wheat, barley and oats stock feed (control group). Cows of the 2<sup>nd</sup> and 3<sup>rd</sup> groups (studied) were fed according to the main diet with substitution of a share of concentrates with natural linseed oil, which constituted 2,5 % of dry matter of the diet (2<sup>nd</sup> group), and the same amount of calcium salts of fatty acids, produced on its base (3<sup>rd</sup> group). The experiment lasted for 30 days. In the research, they used the oil, which was obtained of the domestic cultivar of flax “Orfei”. Diets of the control and studied groups were iso-energetic ones.

Amount of milk, obtained from an animal of each group was measured daily. In the samples of milk, we defined share of fat by acid method, total amount of protein – by the method of formol titration, share of lactose – by refractometric analysis. Fatty acid composition of milk fat was defined by Kurko method. The obtained results are processed biometrically with MS Excel program.

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It is determined that application of the additives of linseed oil in the diets of lactating cows reduced the daily average milk yield and the share of fat, protein and lactose in it. Consequently, it reduced output of the mentioned milk components in the experiment period.

Feeding of cows with calcium salts of fatty acids produced on its base, increased the daily average milk yield and the share of fat in it. However, the share of protein and lactose demonstrated some reduction. For the studied period, the share of obtained milk fat and lactose was larger than the control. The experiment also determined that the share of organic substance reduced in the milk of the second group cows, and in the third group cows the indicator was higher comparing to the control.

Measuring the fatty acid content of milk, it was determined that feeding of cows with fatty additives increased the level of  $C_{18}$  and reduced  $C_{14-16}$  fatty acids in the content of milk fat. Application of calcium salts of fatty acids, produced on the base of linseed oil, in the diet of cows reduces the share of myristic acid and increases the level of linoleic and linolenic acids.

**Conclusions.** Application of the additives of calcium salts of fatty acids, produced on the base of linseed oil, in the diet of lactating cows increases milk fat in milk and rises the share of mono- and polyunsaturated fatty acids in the content of milk fat. Particularly, it reduces the level of  $C_{14-16}$  and increases the share of  $C_{18}$  acids in the content of milk fat.

#### **Bibliographic list**

1. Vovk S. O., Pavkovich S. J. Protection lipids and fatty acids in feed rations cattle. *News of agrarian sciences*. 2016. N 4. P. 48–51.
2. Drozd I. F. Fatty acid composition of oil flax seed in the conditions of the western region of Ukraine. *Bulletin of the Institute of Grain Farming*. 2011. N 40. P. 72–76.
3. Fat supplements in feeding animals and birds: monograph / S. O. Vovk, V. V. Snitynsky, S. J. Pavkovich, B. B. Kruzhel. Lviv: SPOLOM, 2011. 208 p.

4. Kurko V. I. Gas chromatographic analysis of food products. Kyiv: Harvest, 1965. P. 65–69.
5. Bartnikowska E., Kulasek G. Importance of unsaturated fatty acids in human and animal nutrition. *Second Part. Med. wet.* 1994. 50. P. 34–38.
6. Brzóska F. Effect of fatty acid calcium salts from linseed oil on the yield and n-3 fatty acid content of milk and on blood plasma parameters of cows. *J. Anim. Feed Sci.* 2006. V. 15. P. 347–360.
7. Effect of oilseed type on milk fatty acid composition of individual cows, and also bulk tank milk fatty acid composition from commercial farms / K. E. Kliem et al. *Animal.* 2017. V. 11. I.2. P. 354–364.
8. Replacement of saturated with unsaturated fats had no impact on vascular function but beneficial effects on lipid biomarkers, E-selectin, and blood pressure: results from the randomized, controlled dietary intervention and vascular function (DIVAS) study / K. Vafeiadou et al. *Amer. J. Clin. Nutr.* 2015. V. 102. P. 40–48.
9. Sources of n-3 polyunsaturated fatty acids additional to fish oil for livestock diets – a review / D. I. Givens et al. *Nutr. Abstr. Rev.* 2000. Ser. B 70. P. 1–20.